

FIGURE 1A

CTCGAGGACAGTGACCTGGGAGTGAGTACAAGGTGAGGCCACACTCAGGGT  
GCCAGCTCAAGCGGGTACAGGGACGAGGGCTGCGGCCATCAGGAGGCCCT  
GCACACACATCTGGGACACGCGCCCCGAGGGCCAGTCACCTCAGTGCCT  
CATTCCTCCTGCACAAAAGCGCCCCATCCTTCTTCACAAGGCTTCGTGGAAG  
CAGAGGCCTCGATGCCAGTACCCCTCCCTCCAGGCAACGGGACCCCAA  
GTTGCTGACTGGGACCACCAAGCCACGCATGCGTCAAGAGTGAGAGTCCGG  
GACCTAGGCAGGGCCCTGGGTTGGGCCTGAGAGAGAAAGAGAACCTCCCC  
AGCACTCGGTGTGCATCGTAGTGAAGGAGCCTCACCTGACCCCCGCTGTTGC  
TCAATCGACTTCCCAGAACAGAGAGAAAGGAACTTCAGGGCGGCCGG  
GCCTCCTGGGGTTCCCACCCATTAGCTGAAAGCACTGAGGCAGAGCTC  
CCCCTACCCAGGCTCCACTGCCGGCACAGAAATAACAACCACGGTTACTGAT  
CATCTGGGAGCTGTCCAGGAATT

# Germline Locus

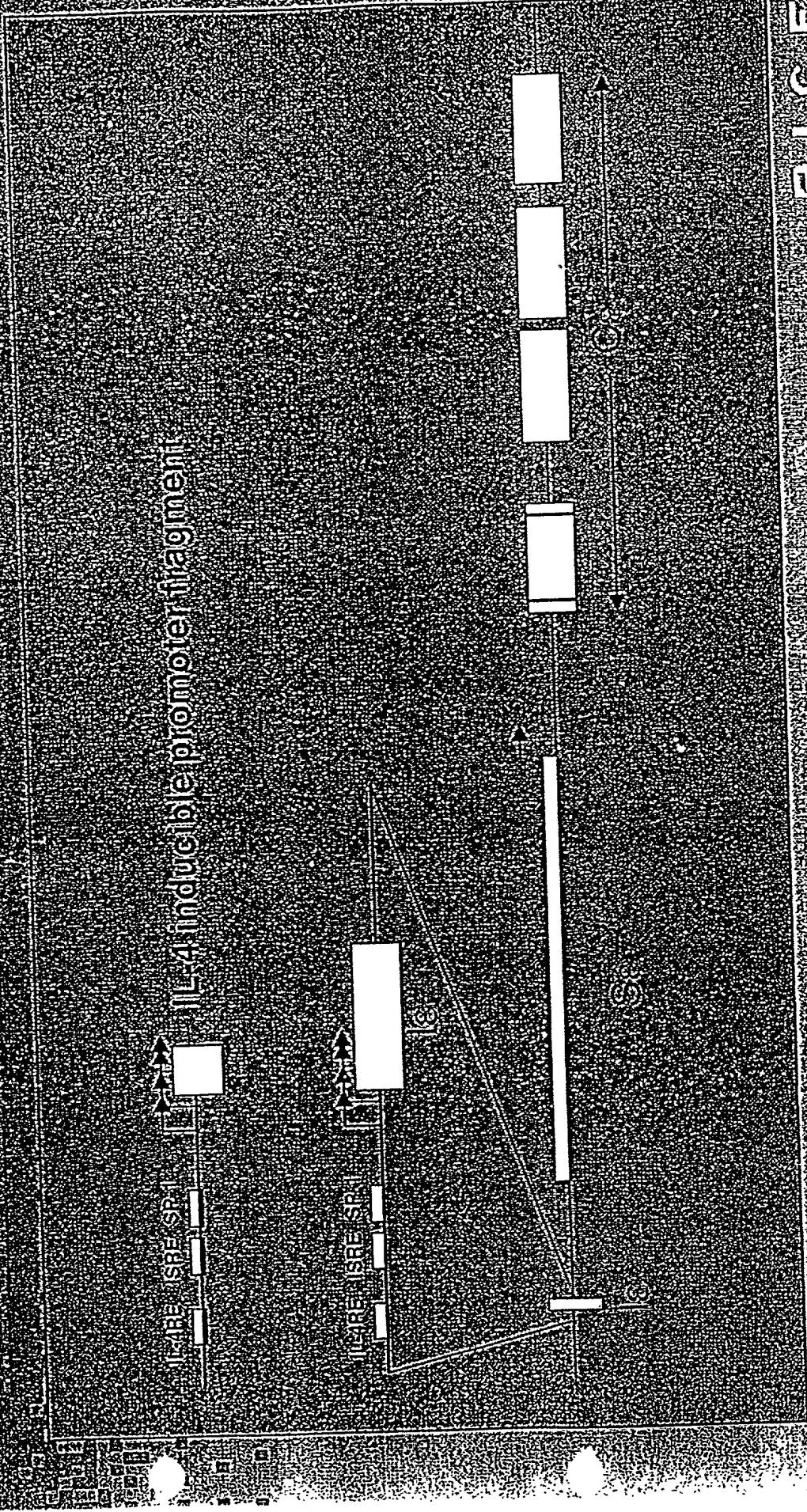
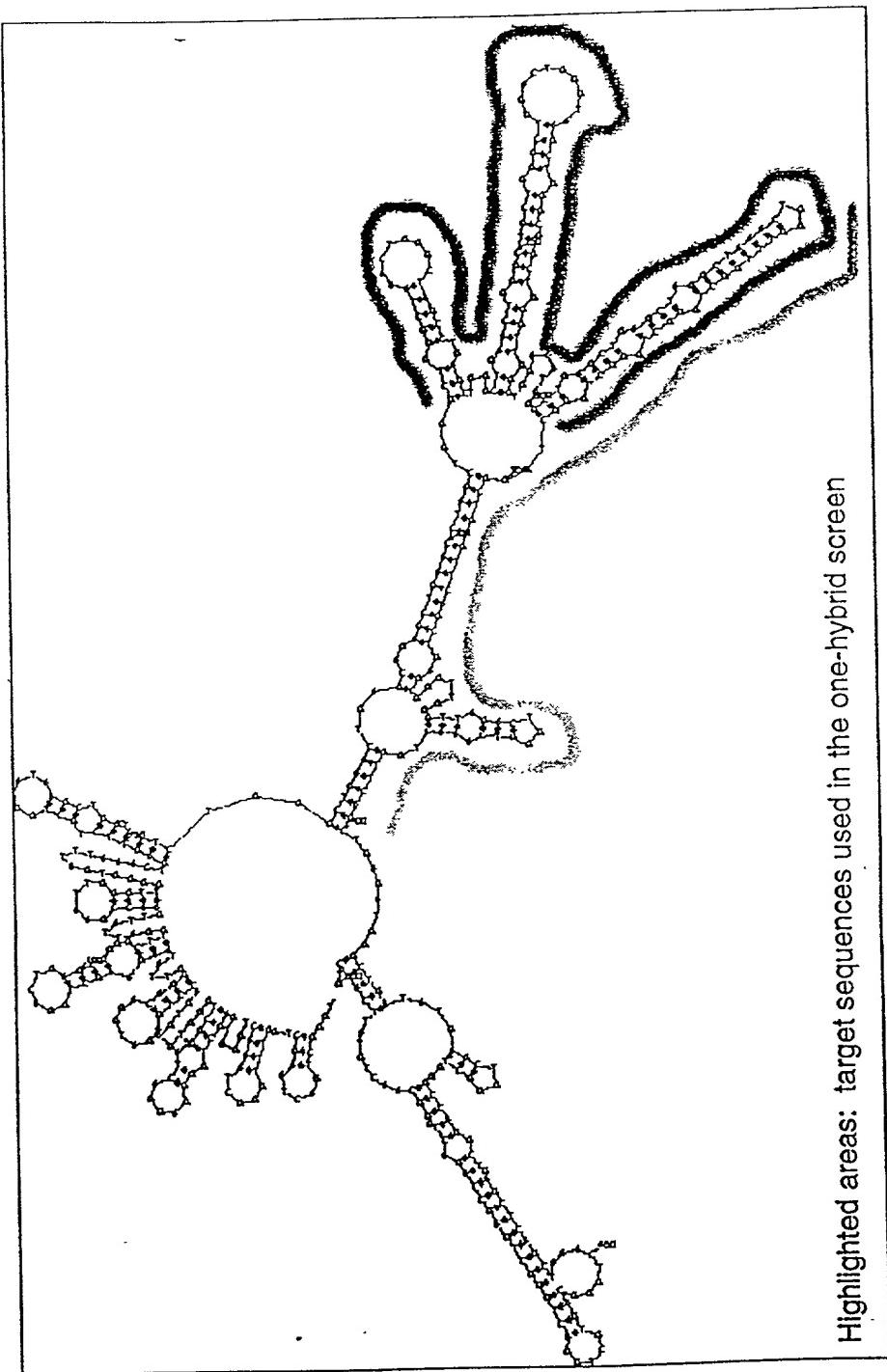


FIGURE 1B

FIGURE 1B

# Low energy DNA folding of the S<sub>E</sub> region

Fig 2A



Appendix E

## FIGURE 2B

1 GCTGGGCTAA ACTGGGCTAG CCTGAGCTGG GCTGAACTGG GCTGCTGGC  
51 TGGACTGGGT AAGCTGGCT GAGCTGGTT GGGTGGAAAT GGGCTGAGCT  
101 GAGCTAGGCT AAACCTGGTT TGGCTGGCT GGGCTGGCT GGG

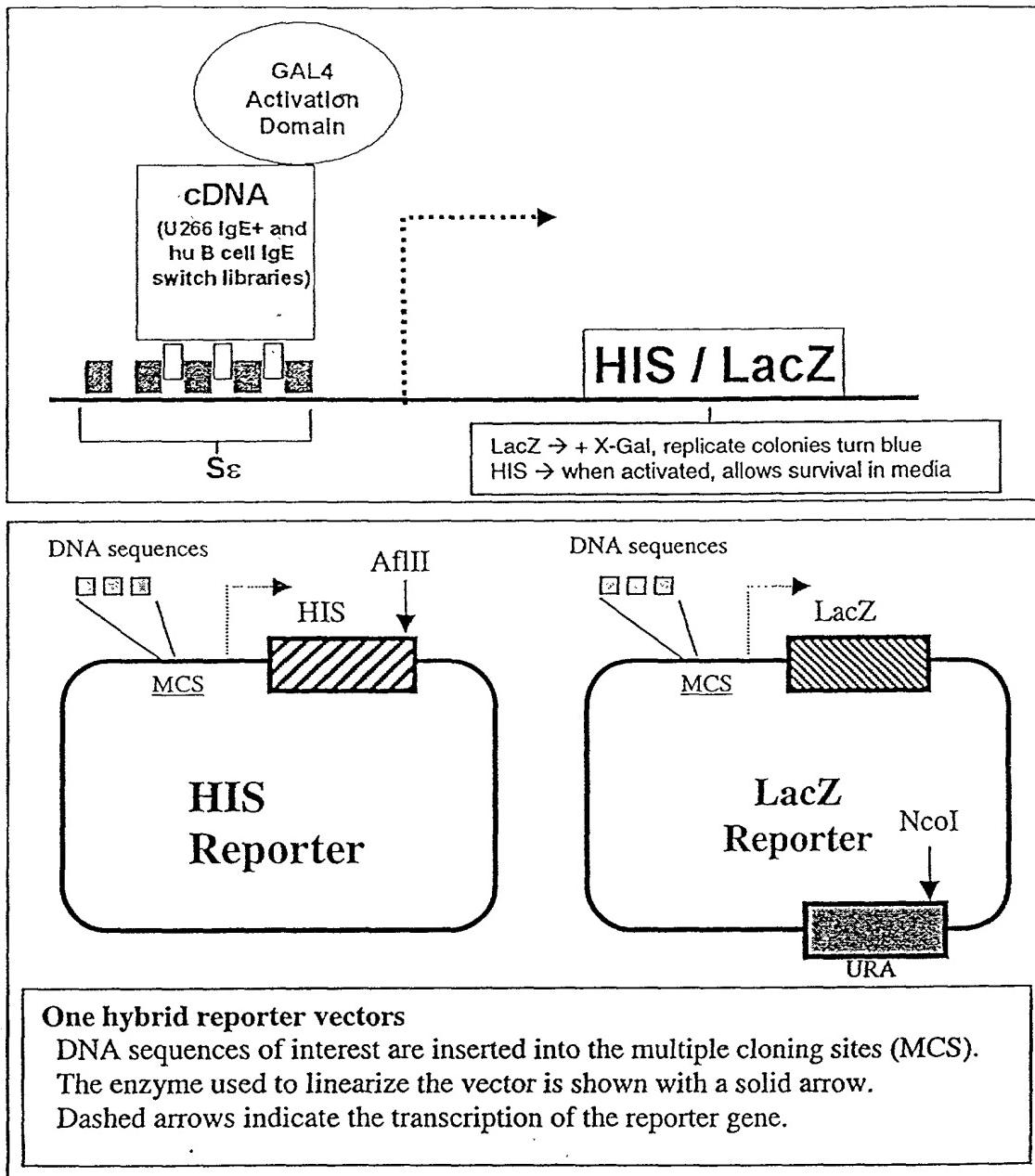
## FIGURE 2C

1 GGTTTGGCTG GGCTGGGCTG GGCTGGGCTG GGTTCAAGCTG AGCGGGTTGG  
51 GTTAGACTGG GTCAAACCTGG TTCAGC

FIG 3

Appendix F

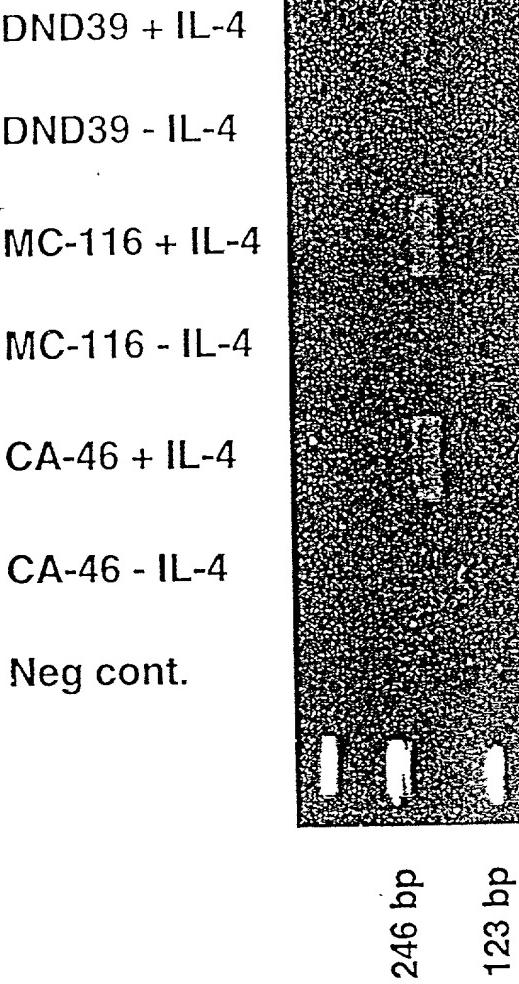
Yeast One-Hybrid Screening



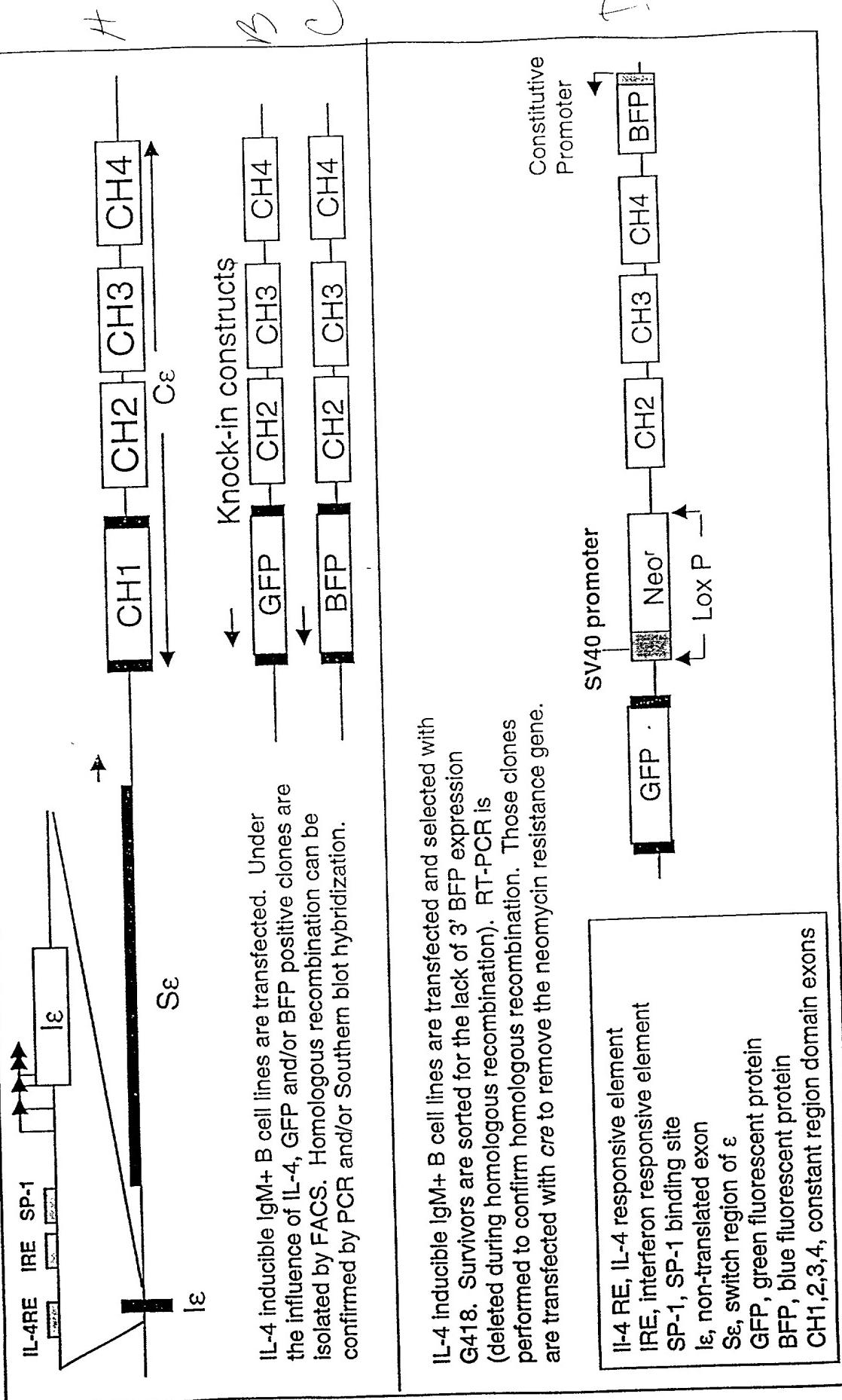
## Appendix G

### IL-4 Induction of Germline $\epsilon$ mRNA in the IgM+ B cell lines: CA-46, MC-116 and DND39

Cells were incubated for 48 hrs in 300 U/ml of h-IL-4. RT-PCR was performed using primers specific for the germline  $\epsilon$  exon and the 5'-end of the  $\epsilon$  CH1 exon (predicted size ~ 200 bp).



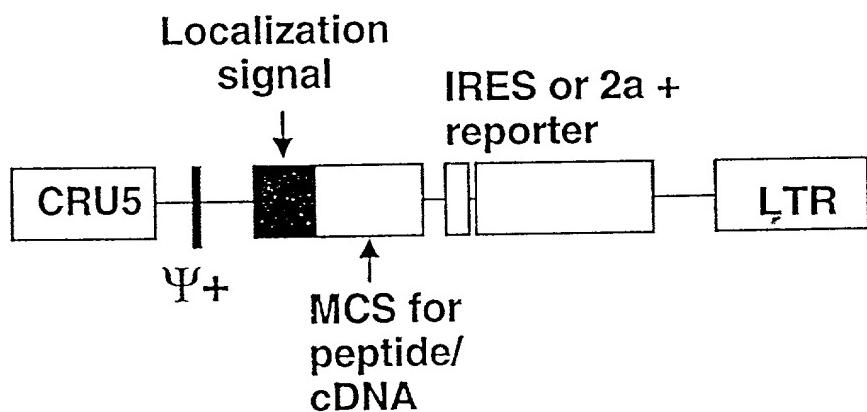
## Approaches to generate germline $\epsilon$ promoter knock-in reporter cell lines



## Appendix A

FIG 6

## Appendix I Rigel Base Vector



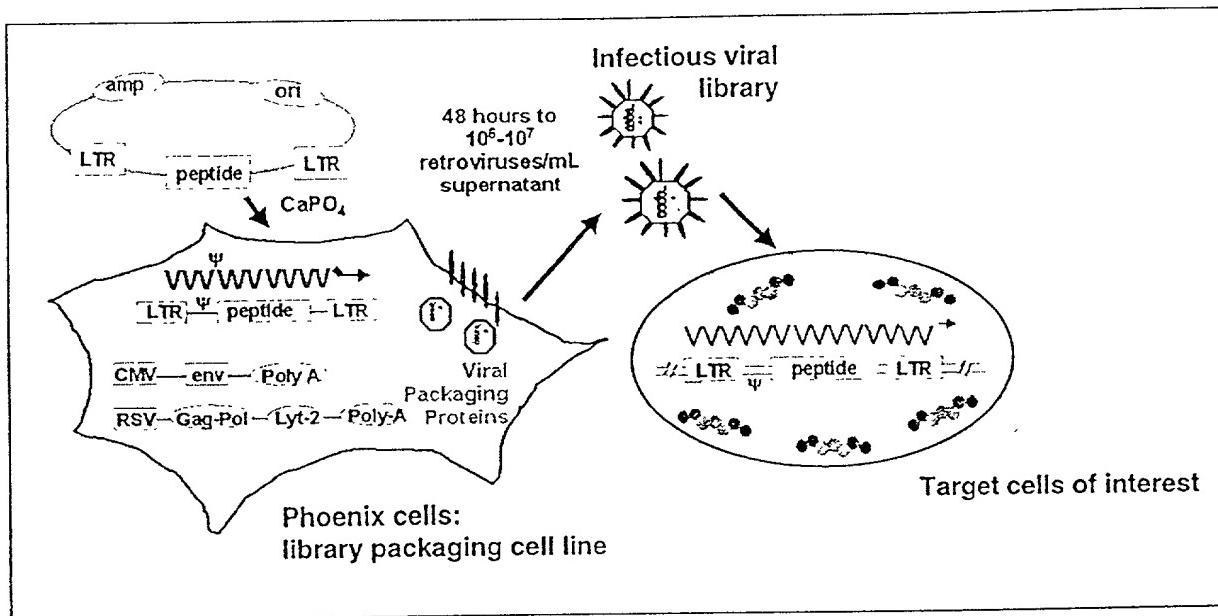
All components are cassetted for flexibility

CRU5, modified LTR  
LTR, long terminal repeat  
 $\psi+$ , packaging signal  
Localization signal: nuclear, cell membrane, granular  
MCS, multiple cloning site  
IRES, internal ribosome entry site  
2a, self-cleaving peptide

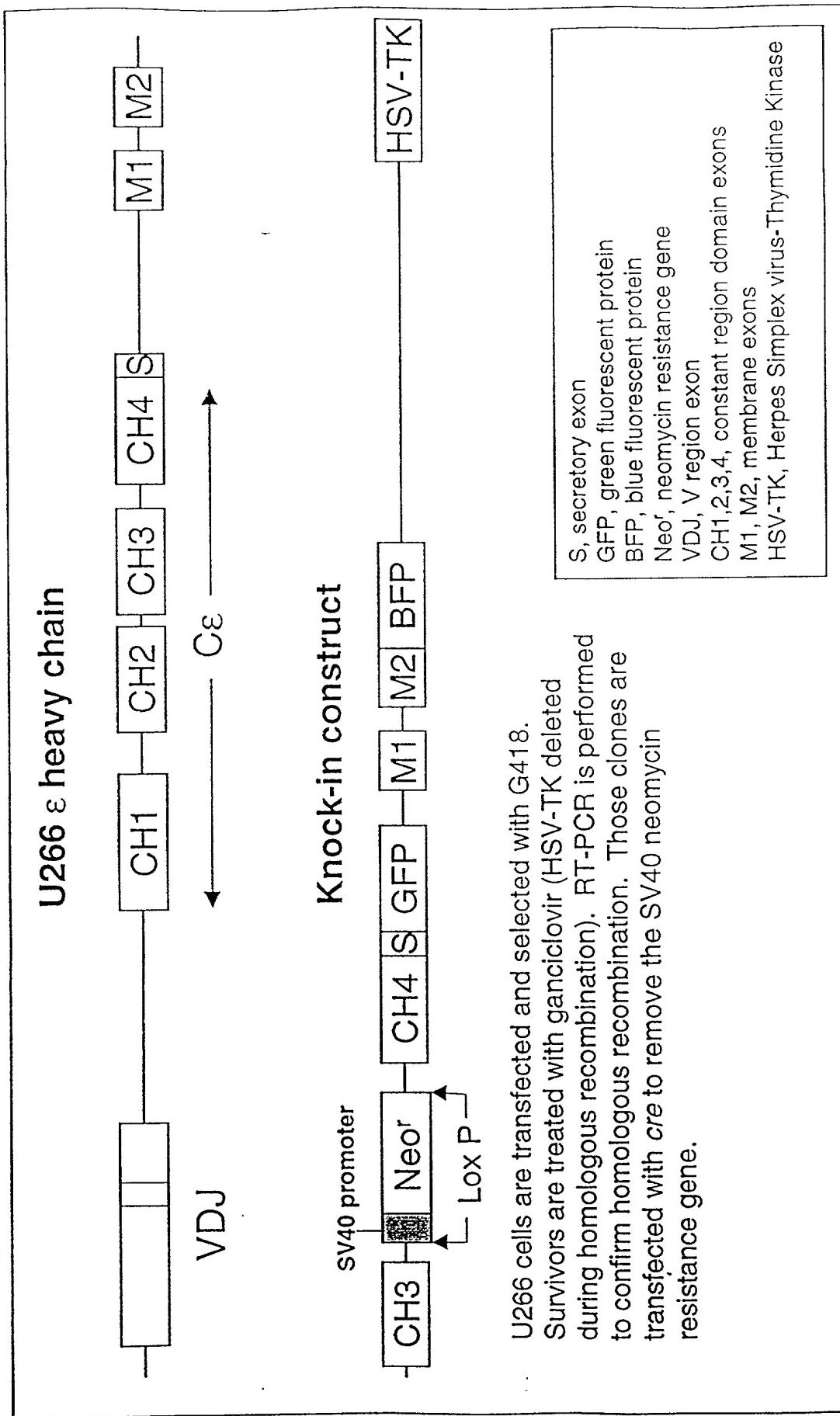
FIG 7

## Appendix H

### Protocol for Transfection of Phoenix Cells and Infection of Nonadherent Target Cells

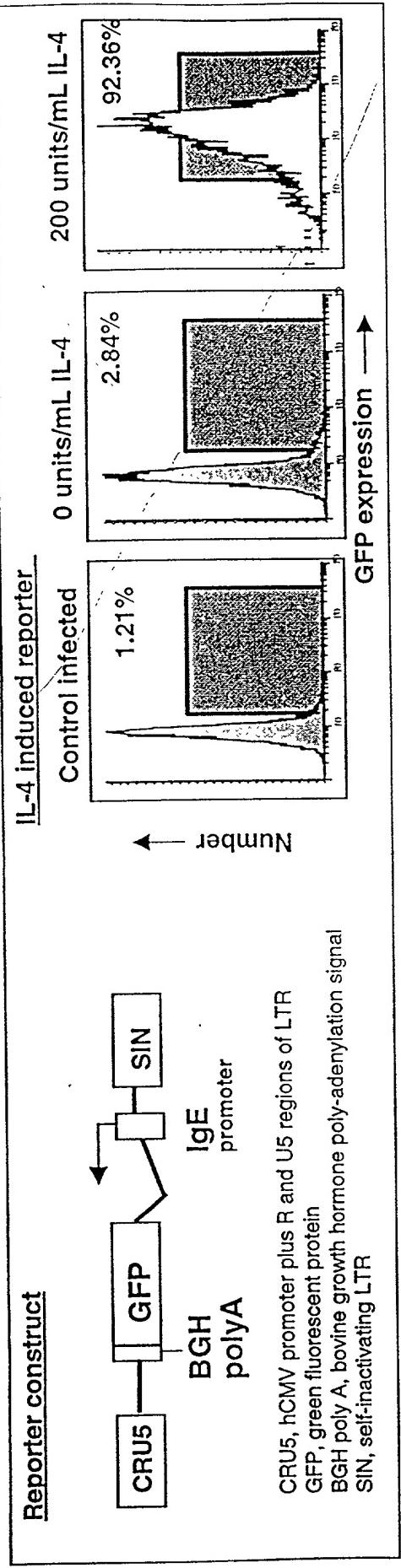


# $\epsilon$ heavy chain GFP/BFP knock-in cell line

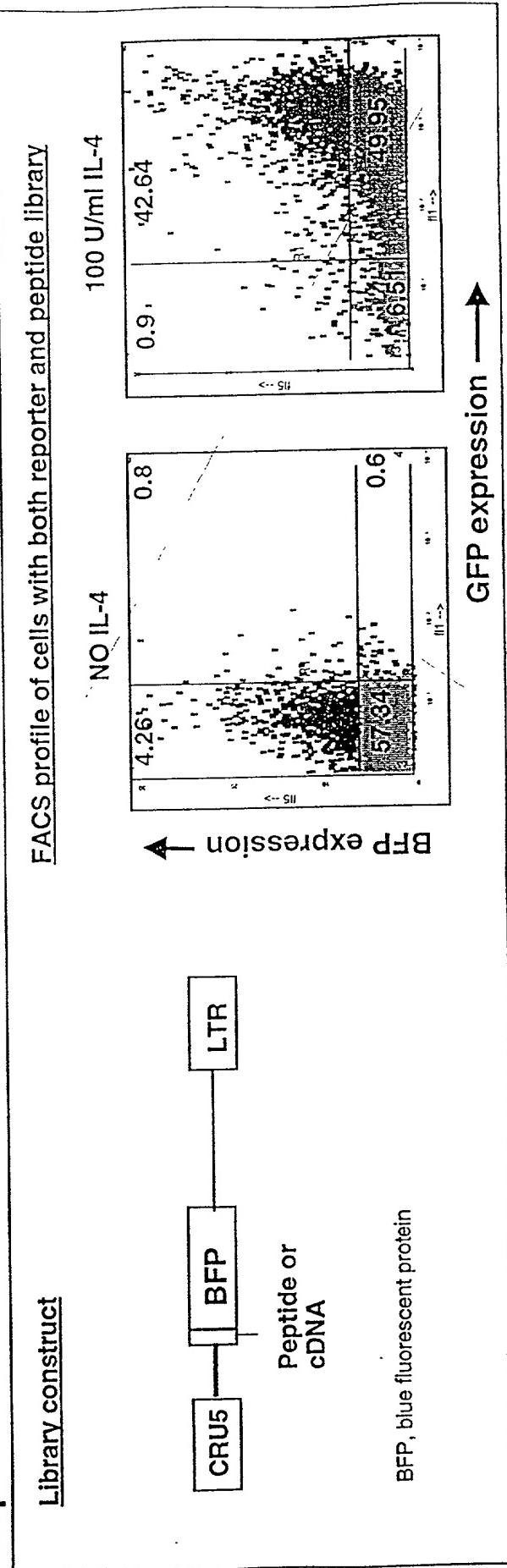


## Appendix D

## IL-4 Inducible ε Promoter Reporter Cell Line



## Reporter Line Infected with BFP Construct

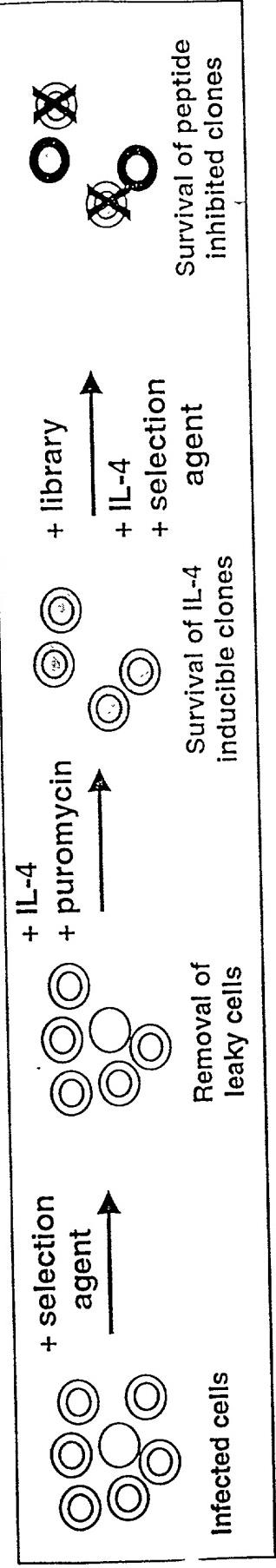


## Appendix C

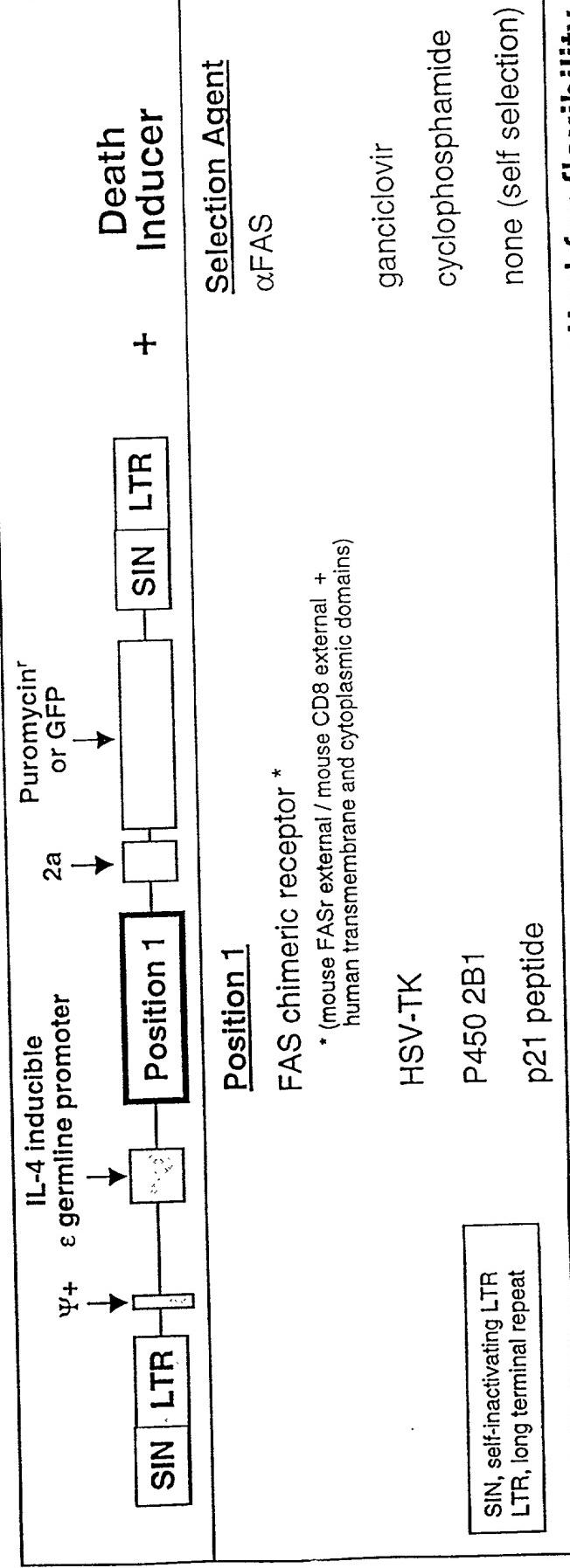
## Appendix D

All components are cassetted for flexibility

### Screen for Peptide Inhibitors of the Germline ε Promoter



### Survival Construct



# FIGURE 11A-1

1-845 CMV promoter/R/U5 5' LTR  
1322 GAG ATG-ATC mutation  
850-2100 extended ψ region  
2146-2173 two BstX1 peptide cloning sites  
2205-2723 ECMV IRES (cloned as EcoR1/Msc1 fragment from  
pCITE-4a [Novagen])  
2746-3465 GFP coding region  
3522-4115 3' LTR  
4122-6210 pGEM backbone (pUC origin, ampR)

ATCACGAGGCCCTTCGCTTCAAGAACAGCTTGCTTTAGGAGTTCTAATACATCC  
CAAACCTAAATATAAAGCATTTGACTTGTCTATGCCCTAGTTATTAAATAGTAATCAA  
TTACGGGGTCATTAGTCATAGCCCATATGGAGTTCCGCCTACATAACTACGGTAA  
ATGGCCCGCCTGGCTGACGCCAACGACCCCCGCCATTGACGTCAATAATGACGTATG  
TTCCCATAGTAACGCCAATAGGGACTTCCATTGACGTCAATGGGTGGAGTATTACGGT  
AAACTGCCACTGGCAGTACATCAAGTGTATCATATGCCAAGTACGCCCTATTGACG  
TCAATGACGGTAAATGGCCGCCTGGCATTATGCCAGTACATGACCTATGGGACTTTC  
CTACTTGGCAGTACATCTACGTATTAGTCATCGCTATTACCATGGTATGCGGTTTGGC  
AGTACATCAATGGCGTGGATAGCGGTTGACTCACGGGATTCCAAGTCTCCACCCCA  
TTGACGTCAATGGGAGTTGTTGGCACCAAAATCAACGGACTTCCAAAATGTCGTA  
ACAACCTCCGCCCATGACGCAAATGGCGGTAGGCATGTACGGTGGGAGGTCTATATAA  
GCAGAGCTCAATAAAAGAGCCCACAACCCCTACTCGGGCGCCAGTCCTCCGATTGACT  
GAGTCGCCCGGGTACCGTGTATCCAATAAACCCCTTGCAGTTGCATCCGACTTGTGGT  
CTCGCTTCTGGAGGGTCTCCTCTGAGTGATTGACTACCCGTAGCGGGGGTCTT  
CATTTGGGGCTCGTCCGGATCGGAGACCCCTGCCAGGGACCACCGACCCACCG  
GGAGGTAAGCTGCCAGCAAACCTATCTGTCTCGATTGTCTAGTGTCTATGACTGA  
TTTATGCGCTCGCTGGTACTAGTAGCTAACTAGCTCTGTATCTGGCGAACCGTGG  
TGGAACTGACGAGTTCGGAACACCCGGCGAACCCCTGGGAGACGTCCCAGGGACTTCGG  
GGCGCTTTGTGGCCGACCTGAGTCCAAAATCCGATCGTTGGACTCTTGGT  
CACCCCTTAGAGGAGGGATATGTGGTTCTGGTAGGAGACGAGAACCTAAAACAGTCC  
CGCCTCCGTCTGAATTTGCTTCGGTTGGGACCGAAGCCGCGCCGCGTCTTGTCT  
GCTGCAGCATCGTCTGTGTTCTGTACTGTGTTCTGTATTTGTCTGAAAATA  
TCGGCCCGGGCCAGACTGTTACCAACTCCCTTAAGTTGACCTTAGGTCACTGGAAAGATG  
TCGAGCGGATCGCTACAACCAAGCTGGTAGATGTCAAGAACAGTGGTTACCTTCT  
GCTCTGCAGAATGGCAAACCTTAACGTGGATGGCGAGACGGCACCTTAACCGAG  
ACCTCATACCCAGGTTAAGATCAAGGTCTTACCTGGCCATGGACACCCAGACC  
AGGTCCCTACATCGTACCTGGAAAGCCTGGCTTTGACCCCCCTCCCTGGGTCAAGC  
CCTTGACACCCCTAACGCTCCGCTCCTCTCCTCCATCCGCCCCGCTCTCCCCCTTG  
AACCTCCTCGTCAACCCGCGCTCGATCCTCCCTTATCCAGCCCTCACTCCTCTAG  
GCGCCCCATATGGCCTATGAGATCTTATGGGGCACCCCCGCCCTGTAAACTTCC  
CTGACCCCTGACATGACAAGAGTTACTAACAGCCCCCTCTCCAAGCTCACTTACAGGCTC  
TCTACTTAGTCCAGCACGAAGTCTGGAGACCTCTGGCGAGACAGTGTGGGTCCGCCGACACC  
ACCGACCGGTGGTACCTCACCCCTACCGAGTCGGAGACACAGTGTGGGTCCGCCGACACC  
AGACTAACCTAGAACCTCGCTGGAAAGGACCTACACAGTCCTGCTGACCAACCCCCCA  
=CCGCCCTCAAAGTAGACGGCATCGCGTTGGATACACGCCGCCACGTGAAGGCTGCCGA  
CCCCGGGGTGGACCATCCTCTAGACTGCCGGATCTCGAGGGATCCACCAACCACATGGACCC  
CCATTAAATTGGAATTCCCTGCAGCCGGGGATCCACTAGTTCTAGAGCGAATTAAATTCC

FIGURE 11A-2

GGTTATTTCCACCATATTGCCGTCTTGGCAATGTGAGGGCCGGAAACCTGGCCCTG  
TCTTCTTGACGAGCATTCTAGGGGCTTTCCCCTCGCCAAGGAATGCAAGGTCTGT  
TGAATGTCGTGAAGGAAGCAGTCCTCTGGAAGCTCTGAAGACAAACAACGTCTGTAG  
CGACCCTTGCAGGCAGCGAACCCCCCACCTGGCGACAGGTGCCTCTCGGGCAAAGC  
CACGTGTATAAGATAACACCTGCAAAGCGGCACAACCCAGTGCACGTGTGAGTTGGA  
TAGTTGTGAAAGAGTCAAATGGCTCTCCTCAAGCGTATTCAACAAGGGCTGAAGGATG  
CCCAGAAGGTACCCATTGTATGGGATCTGATCTGGGCCTCGGTGCACATGCTTACAT  
GTGTTAGTCGAGGTTAAAAACGTCTAGGCCCCCGAACACGGGACGTGGTTTCCT  
TTGAAAAACACGATGATAATATGGGGATCCACCGGTGCCACCATGGTGAGCAAGGGCG  
AGGAGCTGTTACCGGGTGGTGCCTCAGCCGCTACCCGACCACATGAAGCAGCAGCAGCTTCA  
ACAAGTTCAGCGTGTCCGGCGAGGGCGAGGGCGATGCCACCTACGGCAAGCTGACCGTGA  
AGTTCATCTGCACCACCGCAAGCTGCCGTGCCCTGGCCCACCCCTCGTGCACCCCTGA  
CCTACGGCGTGCAGTGCTCAGCCGCTACCCGACCACATGAAGCAGCAGCAGCTTCA  
AGTCCGCCATGCCGAAGGCTACGTCCAGGAGCGCACCATCTTCAAGGACGACGGCA  
ACTACAAGACCGCGCCGAGGTGAAGTCGAGGGCGACACCCCTGGTAACCGCATTGAGC  
TGAAGGGCATCGACTTCAGGAGGACGGCAACATCCTGGGGCACAGCTGGAGTACA  
ACAACAGCCACAACGTCTATATCATGGCCGACAAGCAGAAGAACGGCATCAAGGTGA  
TCAAGATCCGCCACAACATCGAGGACGGCAGCGTGCAGCTGCCGACCACCTACAGCAGA  
ACACCCCATCGCGACGGCCCGTGTGCTGCCGACAACCACACTACCTGAGCACCCAGT  
CCGCCCTGAGCAAAGACCCAAACGAGAAGCGCGATCACATGGTCTGCTGGAGTTGTGA  
CCGCCGCCGGGATCACTCTCGGCATGGACGAGCTGTACAAGTAAAGCGGCCGCTCGACGA  
TAAAATAAAAGATTATTTAGTCTCCAGAAAAGGGGGAAATGAAAGACCCACCTGTA  
GGTTTGGCAAGCTAGCTTAAGTAACGCCATTGCAAGGCATGGAAAAATACATAACTGA  
GAATAGAGAAGTTCAGATCAAGGTAGGAACAGATGGAACAGCTGAATATGGGCAA  
GGATATCTGTGTAAGCAGTTCTGCCGGCTCAGGGCCAAGAACAGATGGAACAGCTG  
AATATGGGCAAACAGGATATCTGTGTAAGCAGTTCTGCCGGCTCAGGGCCAAGAAC  
CAGATGGTCCCCAGATGCGGTCCAGCCCTCAGCAGTTCTAGAGAACCATCAGATGTT  
CAGGGTCCCCAAGGACCTGAAATGACCTGTGCCTTATTGAACTAACCAATCAGTT  
CTTCTCGCTTCTGTCGCGCCTCTGCTCCCCGAGCTCAATAAGAGCCCACAACCC  
TCACTCGGGCGCCAGTCCTCGATTGACTGAGTCGCCGGTACCCGTGTATCCAATA  
ACCCCTTGCACTGCATCCGACTTGTGGTCTCGCTGTTCTGGGAGGGTCTCCTCTGA  
GTGATTGACTACCCGTCAAGCGGGGTCTTGACTTCCGACTTGTGGTCTCGCTGCTT  
GAGGGTCTCCTTGAGTGAATTGACTACCCGTCAAGCGGGGTCTTCACATGCAGCATGT  
CAAAATTAAATTGGTTTTCTTAAGTATTACATTAAATGGCCATAGTTGCATTAA  
GAATCGGCCAACGCGGGGAGAGGGCGTTGCGTATTGGCGCTTCCGCTTCCGCT  
CACTGACTCGCTCGCCTCGGCTCGGCTCGGCGAGCGGTATCAGCTCAACTAAC  
GGTAATACGGTTATCCACAGAACGGGATAACCGCAGGAAGAACATGTGAGCAAAGG  
CCAGCAAAAGGCCAGGAACCGTAAAAGGCCGCGTTGCTGGCTTTCCATAGGCTCC  
CCCCCTGACGAGCATCACAAAATCGACGCTCAAGTCAGAGGTGGCGAAACCGACAGG  
ACTATAAAAGATACCAGGCCTTCCCCCTGGAAGCTCCCTCGTGCCTCTCCTGTT  
CCTGCCGCTTACCGGATACCTGTCGCCCTTCTCCCTCGGAAAGCGTGGCGCTTCTCA  
TAGCTCACGCTGTAGGTATCTCAGTCGGTGTAGGTGCTCGCTCCAAGCTGGCTGT  
GCACGAACCCCCCGTTGACGCCGACCGCTCGGCCTTATCCGTAACATCGTCTTGAGTC  
CAACCCGGTAAGACACGACTTATGCCACTGGCAGCAGCCACTGGTAACAGGATTAGCAG  
AGCGAGGTATGTAGGCAGGTGCTACAGAGTTCTGAAAGTGGTGGCCTAACTACGGCTACAC  
TAGAAGGACAGTATTGGTATCTGCGCTCGCTGAAGCCAGTTACCTCGGAAAAGAGT  
TGGTAGCTTGTACCGGAAACAAACCACCGCTGGTAGCGGTGGTTTTGTTGCAA  
GCAGCAGATTACCGCAGAAAAAGGATCTCAAGAAGATCCTTGTACCTTCTACGGG  
GTCTGACGCTCAGTGGAAAGAAAACCTACGTTAAGGGATTGGTCTGAGATTATCAA  
AAGGATCTCACCTAGATCCTTAAATTAAATGAAAGTTGCGCAAATCAATCTAAAG  
TATATATGAGTAAACTGGTCTGACAGTTACCAATGCTTAATCAGTGAGGCACCTATCTC  
AGCGATCTGTCTATTGCTCATCCATAGTTGCCTGACTCCCCGTCGTAGATAACTAC  
GATACGGGAGGGCTTACCATCTGGCCCCAGTGCCTGCAATGATACCGCGAGACCCACGCTC  
ACCGGCTCCAGATTATCAGCAATAAACCAGCCAGCCGAAGGGCCGAGCGCAGAAGTGG

FIGURE 11A-3

TCCTGCAACTTATCCGCCTCCATCCAGTCTATTAAATTGTTGCCGGGAAGCTAGAGTAAG  
TAGTTGCCAGTTAACAGTTGCGCAACGTTGCCATTGCTACAGGCATCGTGTTGTC  
ACGCTCGTCGTTGGTATGGCTTCATTCACTCAGCTCCGGTCCAAACGATCAAGGCAGTTAC  
ATGATCCCCCATGTTGTGCAAAAAAGCGGTTAGCTCCTTCGGCCTCCGATCGTTGTCAG  
AAGTAAGTTGCCCGCAGTGTATCACTCATGGTTATGGCAGCACTGCATAATTCTCTTAC  
TGTCACTGCCATCCGTAAGATGCTTTCTGTGACTGGTGAGTACTCAACCAAGTCATTCTG  
AGAATAGTGTATGCCGGCGACCGAGTTGCTCTGCCCGCGTCAACACGGGATAATACCGC  
GCCACATAGCAGAACTTAAAAGTGCTCATCATTGAAAACGTTCTCGGGGGCGAAAAC  
CTCAAGGATCTTACCGCTGTTGAGATCCAGTTGATGTAACCCACTCGTGCACCCAAC  
ATCTTCAGCATTTTACTTCACCAGCGTTCTGGGTGAGCAAAACAGGAAGGCAAA  
TGCCGCAAAAAGGAATAAGGGCGACACGGAAATGTTGAATACTCATACTCTTCTTT  
TCAATATTATTGAAGCATTATCAGGGTTATTGTCATGAGCGGATACATATTGAATG  
TATTAGAAAAATAACAAATAGGGTTCCGCGCACATTTC

## FIGURE 11B-1

1-845 CMVpormoter/R/U5 5' LTR  
1322 GAG ATG-ATC mutation  
850-2100 extended □ region  
2151-2865 GFP coding region  
2866-2894 GGGSGGG linker  
2895-2952 FMDV 2a cleavage sequence  
2953-3004 Bstxl/Bstxl/HinD3/Hpa1/Sall/Not1 polylinker  
3052-3645 3' LTR  
3652-5715 pGEM backbone (pUC origin, ampR)

ATCACGAGGCCCTTCGTCTCAAGAACAGCTTGCTCTTAGGAGTTQCTAATACATC  
CCAAACTCAAATATATAAAGCATTGACTTGTCTATGCCCTAGTTATTAATAGTAATC  
AATTACGGGGTCATTAGTCATAGCCCATAATGGAGTTCCCGTACATAACTTACGG  
TAAATGGCCCGCCTGGCTGACCGCCAACGACCCCCGCCATTGACGTCAATAATGACG  
TATGTTCCCATAAGTAACGCCAATAGGGACTTCCATTGACGTCAATGGTGGAGTATT  
ACGGTAAACTGCCCACTTGGCAGTACATCAAGTGTATCATATGCCAAGTACGCCCTA  
TTGACGTCAATGACGGTAAATGGCCCGCCTGGCATATGCCAGTACATGACCTTATGG  
GACTTCTACTTGGCAGTACATCTACGTATTAGTCATCGCTATTACCATGGTATGCG  
GTTTGGCAGTACATCAATGGCGTGGATAGCGGTTGACTCACGGGATTCCAAGTC  
TCCACCCCATTGACGTCAATGGAGTTGGCACCATAACGGGACTTCCA  
AAATGTCGAACAACCTCCGCCCCATTGACGCAAATGGCGGTAGGCATGTACGGTGGGA  
GGTCTATATAAGCAGAGCTCAATAAAAGAGCCCACAACCCCTCACTCGGGCGCCAGTC  
CTCCGATTGACTGAGTCGCCCGGGTACCCGTGTATCCAATAACCCCTTGCAGTTGCA  
TCCGACTTGTGGTCTCGCTGTTCCCTGGGAGGGTCTCCTCTGAGTGATTGACTACCGT  
CAGCGGGGTCTTCATTGGGGCTCGTCCGGATCGGGAGACCCCTGCCAGGGACC  
ACCGACCCACCACCGGGAGGTAAAGCTGGCCAGCAACTTATCTGTGTCTGTCCGATTGTC  
TAGTGTCTATGACTGATTTATGCGCCTGCGTCGGTACTAGTTAGCTAACTAGCTCTGT  
ATCTGGCGGACCCGTGGAACTGACGAGTCGGAACACCCGGCCGAAACCCCTGGGAG

FIGURE 11B-2

ACGTCCCAGGGACTTCGGGGCCGTTTGTGGCCCGACCTGAGTCCAAAATCCCGAT  
CGTTTGGACTCTTGGCACCCTCTAGAGGAGGGATATGTGGTTCTGGTAGGAGA  
CGAGAACCTAAAACAGTCCCGCCTCGTCTGAATTTCGCTTCGGTTGGGACCGAA  
GCCGCCGCAGCGTCTTGTCTGCAGCATCGTCTGTGTTCTGTACTGTGACTGTG  
TTCTGTATTGTCTGAAAATATCGGCCCCGGCAGACTGTTACCACTCCCTTAAGTT  
GACCTAGGTCACTGGAAAGATGTCGAGCGGATCGCTACAACCAGTCGGTAGATGTCA  
AGAAGAGACGTGGTTACCTTGTCTGCAGAATGGCCAACCTTAACGTCGGATGG  
CCGCAGACGGCACCTTAACCGAGACCTCATCACCCAGGTTAAGATCAAGGTCTTTC  
ACCTGGCCGCATGGACACCCAGACCAGGTCCCCATACATCGTACCTGGGAAGCCTTGG  
CTTTGACCCCCCTCCCTGGGTCAAGCCCTTGACACCCTAACGCTCCGCCTCTCT  
CCTCCATCCGCCCCGTCTCTCCCCCTGAACCTCCTCGTTCGACCCCGCCTCGATCCTC  
CCTTATCCAGCCCTACTCCTCTAGGCGCCCCATATGCCATATGAGATCTTAT  
ATGGGGCACCCCCGCCCTTGAAACTCCCTGACCCCTGACATGACAAGAGTTACTAAC  
AGCCCCCTCTCCAAGCTCACTTACAGGCTCTACTTAGTCCAGCACGAAGTCTGGAG  
ACCTCTGGCGGCAGCCTACCAAGAACACTGGACCGACCGGGTACCTCACCCCTAAC  
GAGTCGGCGACACAGTGTGGTCCGCCAGACACCAGACTAAGAACCTAGAACCTCGCTGG  
AAAGGACCTTACACAGTCCTGCTGACCACCCCCACCGCCCTCAAAGTAGACGGCATCGC  
AGCTTGGATAACGCCGCCACGTGAAGGCTGCCGACCCCGGGGGTGGACCATCCTCTA  
GAECTGCCGGATCTCGAGGGATCCACCATGGTGAAGCAAGGGGAGGAGCTGTCACCGGG  
GTGGTGCCTACCTGGTCGAGCTGGACGGCACGTAACGCCACAAGTTAGCGTGTGTC  
CGGCAGGGCGAGGGCGATGCCACCTACGGCAAGCTGACCCCTGAAGTTCATCTGCACCA  
CCGGCAAGCTGCCGTGCCCTGCCACCCCTCGTGAACCCCTGACCTACGGCGTGCAG  
TGCTTCAGCCGTACCCGACCACATGAAGCAGCACGACTTCTCAAGTCCGCCATGCC  
CGAAGGCTACGTCCAGGAGCGCACCATCTTCTCAAGGACGACGGCAACTACAAGACCC  
GCGCCGAGGTGAAGTTGAGGGCGACACCCCTGGTAACCGCATCGAGCTGAAGGGCATC  
GACTTCAAGGAGGACGGCAACATCCTGGGGCACAAGCTGGAGTACAACACTAACAGCCA  
CAACGTCTATATCATGGCCGACAAGCAGAACGGCATCAAGGTGAACCTCAAGATCC  
GCCACAAACATCGAGGACGGCAGCGTGCAGCTGCCGACCAACTACCAGCAGAACACCCCC  
ATCGGGCAGGGCCCCGTGCTGCCGACAACCAACTACCTGAGCACCCAGTCCGCCCT  
GAGCAAAGACCCCAACGAGAACGGCGATCACATGGCCTGCTGGAGTTGACCGCCG  
CCGGGATCACTCTGGCATGGACGGAGCTGTACAAGGAATTGGAGGTGGCAGCGGTGGC  
GGTCAGCTGTTGAATTGACCTTCTTAAACTTGCAGGGAGACGTCGAGTCAACCCCTGG  
GCCACCACCAACATGGAAGCTCCATTAAATTGGTAACGTCGACGCCGCGCTCGAC  
GATAAAATAAAAGATTTATTAGTCTCCAGAAAAAGGGGGGAATGAAAGACCCACCT  
GTAGGTTGGCAAGCTAGCTTAAGTAACGCCATTGCAAGGCATGGAAAAATACATAA  
CTGAGAATAGAGAACAGTCAGATCAAGGTCAAGGAAACAGATGGAACAGCTGAATATGGGCC  
AAACAGGATATCTGTGTTAAGCAGTCCCTGCCCGGCTCAGGGCCAAGAACAGATGGAA  
CAGCTGAATATGGGCCAACAGGATATCTGTGTTAAGCAGTCCCTGCCCGGCTCAGGG  
CCAAGAACAGATGGTCCCCAGATGCGGTCCAGCCCTCAGCAGTTCTAGAGAACCATCA  
GATGTTCCAGGGTGCCCAAGGACCTGAAATGACCTGTGCCTTATTGAACTAACCA  
ATCAGTTCGCTTCTCGCTTCTGTTCGCGCCTCTGCTCCCCGAGCTCAATAAAAGAGC  
CCACAAACCCCTCACTCGGGGCCAGTCCTCCGATTGACTGAGTCGCCCCGGCTCAGGG  
GTATCCAATAACCCCTTGTGAGTTGACCTGCAAGGACTCGACTTGTGGTCTCGCTGTTCTGGGAG  
GGTCTCCTCTGAGTGATTGACTACCGTCAGCGGGGTCTTCATTCCGACTTGTGGT  
CTCGCTGCCTGGAGGGTCTCCTCTGAGTGATTGACTACCCGTCAGCGGGGTCTTCA  
CATGCAGCATGTATCAAAATTAAATTGGTTTTCTTAAGTATTACATTAAATGGC  
CATAGTTGCAATTAAATGAACTCGGCCAACGCGCGGGAGAGGGCGTTGCGTATTGGCGCT

FIGURE 11B-3

CTTCCGCTTCCTCGCTCACTGACTCGCTGGCTCGTCGGCTCGGGCGAGCGGTA  
TCAGCTCACTCAAAGCGGTAAACGGTTATCCACAGAACATCAGGGATAACGCAGGAAA  
GAACATGTGAGCAAAAGGCCAGCAAAAGGCCAGGAACCGTAAAAGGCCGCGTGCTGG  
CGTTTTCATAGGCTCCGCCCCCTGACGAGCATCACAAAATCGACGCTCAAGTCAG  
AGGTGGCGAAACCGACAGGACTATAAAGATAACCAGGCCTCCCGCTGGAGCTCCCT  
CGTGCCTCTCCGTGCTCCGACCCCTGCCGCTTACCGGATACCTGTCCGCCCTTCTCCCT  
CGGGAAAGCGTGGCGCTTCTCATAGCTCACGCTGTAGGTATCTCAGTCGGTAGGTC  
GTTCGCTCCAAGCTGGCGTGTGCACGAACCCCCCGTTAGCCGACCGCTGCCCTT  
ATCCGGTAACATCGTCTTGAGTCCAACCCGGTAAGACACGACTTATGCCACTGGCAG  
CAGCCACTGGTAACAGGATTAGCAGAGCGAGGTATGTAGGCGGTGCTACAGAGTTCTG  
AAAGTGGTGGCCTAACTACGGCTACACTAGAAGGACAGTATTGGTATCTCGCCTGCT  
GAAGCCAGTTACCTCGGAAAAAGAGTTGGTAGCTCTGATCCGGCAAACAAACCACCG  
CTGGTAGCGGTGTTTTGTTGCAAGCAGCAGATTACGCGCAGAAAAAAAGGATCT  
CAAGAAGATCCTTGATCTTCTACGGGCTTGACGCTCAGTGGAACGAAAACCTACG  
TTAAGGGATTTGGTCATGAGATTATCAAAAAGGATCTCACCTAGATCCTTAAATT  
AAAAATGAAGTTGCGCAAATCAATCTAAAGTATATGAGTAAACTGGTCTGACAGT  
TACCAATGCTTAATCAGTGAGGCACCTATCTCAGCGATCTGCTATTGTTCATCCAT  
AGTTGCCCTGACTCCCCGTCGTAGATAACTACGATACGGGAGGGCTTACCATCTGGCC  
CCAGTGCTGCAATGATAACCGCGAGACCCACGCTCACCGCTCCAGATTATCAGCAATA  
AACCAAGCCAGCCGAAGGGCCGAGCGCAGAAGTGGCTTGCAACTTATCCGCTCCAT  
CCAGTCTATTAAATTGTTGCCATTGCTACAGGCATCGTGGTGTACGCTCGTGGTATGGCT  
GCAACGTTGTTGCCATTGCTACAGGCATCGTGGTGTACGCTCGTGGTATGGCT  
TCATTGCTCCGGTTCCAACGATCAAGGCAGTTACATGATCCCCATGTTGTGCAA  
AAAAGCGGTTAGCTCCTCGGTCCGATCGTTGTCAGAAGTAAGTGGCCGAGTGT  
TATCACTCATGGTTATGGCAGCAGCAGCATAATTCTTACTGTCATGCCATCCGTAAGA  
TGCTTTCTGTGACTGGTGAGTACTCAACCAAGTCATTCTGAGAATAGTGTATCGGGCG  
ACCGAGTTGCTCTGCCGGCGTCAACACGGGATAATACCGGCCACATAGCAGAACTT  
TAAAAGGCTCATCATTGAAAACGTTCTCGGGCGAAAACGTCAGGATCTTACCG  
CTGTTGAGATCCAGTTCGATGTAACCCACTCGTCACCCACTGATCTCAGCATCTT  
TACTTTCACCAGCGTTCTGGGTGAGCAAAACAGGAAGGAAAATGCCGAAAAAGG  
GAATAAGGGCGACACGGAAATGTTGAATACTCATACTCTCCCTTTCAATATTATTGA  
AGCATTATCAGGGTTATTGTCTCATGACATTAACCTATAAAATAGGCAGT

# FIGURE 11C-1

1-845 CMV promoter/R/U5 5' LTR  
1322 GAG ATG-ATC mutation  
850-2100 extended II region  
2146-2173 two BstX1 peptide cloning sites  
2173-2214 EcoRI/ApaI/HpaI/NotI polylinker  
2262-2855 3' LTR  
2855-4901 pGEM backbone (pUC origin, ampR)

ATCACGAGGCCCTTCGTCTCAAGAACAGCTTGCTCTTAGGAGTTCTTAATACATCCAAACTCAAAT  
ATATAAAGCATTGACTTGTCTATGCCCTAGTTATTAGTAATCAATTACGGTCATTAGTCATAG  
CCATATATGGAGTCCCGTACATAACTTACGGTAAATGGCCCGCCTGCTGACCGCCCAACGACCCCCG  
CCCATTGACGTCAATAATGACGTATGTCCTAGTAACGCCAATAGGGACTTCCATTGACGTCAATGGG  
TGGAGTATTACGGTAAACTGCCACTTGGCAGTACATCAAGTGTATCATATGCCAAGTACGCCCTATT  
GACGTCAATGACGGTAAATGGCCCGCTGCATTATGCCAGTACATGACCTTATGGGACTTCCACTTG  
GCACTACATCTACGTATTAGTCATCGCTATTACCATGGTATGCGGTTTGGCAGTACATCAATGGCGTG  
GATAGCGTTGACTCACGGGATTCCAAGTCTCCACCCATTGACGTCAATGGGAGTTGTTTGGCAC  
CAAATCAACGGACTTCCAAAATGCTAACAACTCCGCCATTGACGCAAATGGCGGTAGGCATGT  
ACGGTGGAGGTCTATATAAGCAGAGCTAACAAAAGAGGCCACAACCCCTCACTGGGGCGCAGTCCTC  
CGATTGACTGAGTCGCCGGTACCCGTATCCAATAAACCTTTCAGTGCATCCACTTGTGGTCT  
CGCTGTTCTGGGAGGGTCTCTGAGTGAATGACTACCCGTAGCGGGGTCTTCATTGGGGCTC  
GTCCGGGATCGGGAGACCCCTGCCAGGGACCACCGACCCACCGGAGTAAGTGGCCAGCAACTTA  
TCTGTGTCTGTCGATTGTCTAGTGTCTATGACTGATTATGCCCTGCGTGGTACTAGTTAGCTAAC  
AGCTCTGTATCTGGCGGACCCGTGGAAACTGACGGAGTTCGGAACACCCGGCGAACCCCTGGGAGACGT  
CCCAGGGACTTCGGGGGCGTTTGCTGCCGACCTGAGTCAAAATCCGATCGTTTGGACTTTG  
GTGCACCCCTTAGAGGAGGGATATGTGGTCTGGTAGGAGACGAGAACCTAAACAGTCCGCTCCG  
TCTGAATTTCGTTTCGGTTGGGACCGAAGCCGCGCGCGTCTGTCTGCTGCAGCATCGTCTGT  
TTGTCTCTGTCTGACTGTGTTCTGTATTGTCTGAAATATGCCCGGGCCAGACTGTTACCAACTCC  
TAAGTTGACCTTAGGTCACTGGAAAGATGTCGAGCGGATCGCTACAACCAGTCGTAGATGTCAAGAAG  
AGACGTTGGTTACCTCTGCTCTGCAGAACCTTAACGTCGATGGCCGAGACGGCACCT  
TAACCGAGACCTCATCACCCAGGTTAAGATCAAGGTCTTTCACCTGGCCGATGGACACCCAGG  
TCCCTACATCGTGACCTGGGAAGCCTGGCTTTGACCCCTCCCTGGGTCAAGCCCTTGACACC  
AAGCCTCCGCTCTCCATCCGGCCGCTCTGAAACCTCCTCGACCCGCTCG  
ATCCCTCCCTTATCCAGCCCTACTCCTCTAGCGGCCCATATGCCATATGAGATCTTATATGGG  
CACCCCGCCCTGTAACCTCCGTACCGTACAGTCTGCTGACCCACCCGCGCTCAAAGTAGACGG  
CACTTACAGGCTCTACTTAGTCCAGCAGCAAGTCTGGAGACCTCTGGCGCAGCTACCAAGAAC  
GGACCGACCGGTGGTACCTCACCCCTACCGAGTCGGGACACAGTGTGGTCCGCCACACCAGACTAAGA  
ACCTAGAACCTCGCTGAAAGGACCTAACAGTCTGCTGACCCACCCGCGCTCAAAGTAGACGG  
ATCGCAGTTGGATACACGCCGCCACGTGAAGGCTGCCACCCGGGGTGGACCATCCTCTAGACTGCC  
GGATCTCGAGGGATCCACCACATGGACCCCATTAATGGAATTGGGCCAAGCTTGTAAACGTG  
ACGCGGCCGCGCTGACGATAAAAGATTTATTAGTCTCCAGAAAAGGGGGAAATGAAAGACCC  
CACCTGTAGGTTGCAAGCTAGCTTAAGTAACGCCATTGCAAGGCATGGAAAATACATACTGAGAA  
TAGAGAAAGTTCAGATCAAGGTAGGAACAGATGGAACAGCTGAATATGGCCAACAGGATATCTGTGGTA  
AGCAGTTCTGCCCGCTAGGGCCAAGAACAGATGGAACAGCTGAATATGGCCAACAGGATATCTGT  
GGTAAGCAGTTCTGCCGGCTCAGGGCCAAGAACAGATGGCCCCAGATGCCAGCAG  
TTCTAGAGAACCATCAGATGTTCCAGGGTGCCTCAAGGACCTGAAATGACCTGTGCCTTATTGAACTA  
ACCAATCAGTCGCTTCTCGCTTCTGTCGCGCCTCTGCTCCCCGAGCTCAATAAAAGAGGCCACAACC  
CCTCACTGGGGGCCAGTCCTCCGATTGACTGAGTCGCCGGTACCCGTATCCAATAACCCCTCTTG

FIGURE 11C-2

0986926 · 0986926  
CAGTTGCATCCGACTTGTGGCTCGCTGTTCTGGGAGGGCTCCTCTGAGTGATTGACTACCCGTCA  
GGGGTCTTCATTCCGACTTGTGGCTCGCTGCCTGGGAGGGCTCCTCTGAGTGATTGACTACCCGT  
CAGCGGGGGTCTTCACATGCAGCATGTATAAATTAAATTGGTTTTCTTAAGTATTACATTAAAT  
GCCCATAGTTGCATTAATGAATCGGCCAACGCGCGGGGAGAGGCGGTTGCGTATTGGCGCTCTCCGCTT  
CCTCGCTCACTGACTCGCTGCCTCGGTCTGGCTCGCGAGCGGTATCAGCTCACTCAAAGGCGGT  
ATACGGTTATCCACAGAATCAGGGATAACGCAGGAAGAACATGTGAGCAGCAAAGGCCAGCAAAGGCCAG  
GAACCGTAAAAGGCCGCTGCTGGCTTTCCATAGGCTCCGCCCCCTGACGAGCATCACAAAATC  
GACGCTCAAGTCAGAGGTGGCGAAACCCGACAGGACTATAAAGATAACCAGGCGTTCCCGCTTGGAAAGCTCC  
CTCGTGCCTCTCCTGTTCCGACCCCTGCCGTTACCGATACTGTCCGCTTCTCCCTCGGAAAGCGT  
GGCGCTTCTCATAGCTCACGCTGTAGGTATCTCAGTTCGGTAGGTGCGCTCCAAGCTGGGCTGTG  
TGCACGAACCCCCCGTTCAGCCCACCGCTGCCCTATCCGTAACACTATCGTCTGAGTCAAACCCGGTA  
AGACACGACTATGCCACTGGCAGCAGCCACTGGTAACAGGATTAGCAGAGCAGGATATGAGGCGGT  
TACAGAGTTCTGAAGTGGTGGCTAACTACGGCTACACTAGAAGGACAGTATTGGTATCTCGCTCTGC  
TGAAGCCAGTTACCTCGAAAAAGAGTTGGTAGCTCTGATCCGCAAACAAACCAACCGCTGGTAGCGGT  
GGTTTTTTGTTGCAAGCAGCAGATTACGCGCAGAAAAAAAGGATCTAAGAAGATCCTTGATCTTTC  
TACGGGGTCTGACGCTCAGTGGAACGAAACTCACGTTAAGGATTGGTCATGAGATTATCAAAGGA  
TCTTCACCTAGATCCTTTAAATTAAAAATGAAGTTGCGCAAATCAATCTAAAGTATATGAGTAAACT  
TGGTCTGACAGTTACCAATGCTTAATCAGTGAGGCACCTATCTCAGCGATCTGTCTATTCGTTCATCCAT  
AGTTGCCTGACTCCCCGTCGTAGATAACTACGATAACGGGAGGGCTTACCATCTGGCCCCAGTGCTGCAA  
TGATACCGCAGACCCACGCTCACCGGCTCCAGATTATCAGCAATAAACCAAGCCAGCCGGAAAGGGCCGAG  
CGCAGAAGTGGCCTGCAACTTATCCGCTCCATCCAGTCTATTAAATTGTTGCCGGGAAGCTAGAGTAAG  
TAGTTGCCAGTTAATAGTTGCGCAACGTTGTTGCCATTGCTACAGGCATCGTGGTCACGCTCGT  
TTGGTATGGCTTCATTCACTCCGGTCTCCAAAGATCAAGGCAGATTACATGATCCCCATGTTGTGCAA  
AAAGCGGTTAGCTCCTCGGTCTCCGATCGTTGTCAGAAGTAAGTTGGCGCAGTGTATCAGT  
TATGGCAGCACTGCATAATTCTCTTACTGTCATGCCATCCGTAAGATGCTTTCTGTGACTGGTAGTACT  
CAACCAAGTCATTCTGAGAATAGTGTATCGGGCGACCGAGTTGCTCTTGGCCGGTCAACACGGGATAAT  
ACCGCGCACATAGCAGAACTTTAAAGTGCTCATCATGGAAAACGTTCTCGGGCGAAAATCTCAAG  
GATCTTACCGCTGTTGAGATCCAGTTGCGATGTAACCCACTCGTCACCCAACTGATCTCAGCATTTA  
CTTCACCAAGCGTTCTGGGTGAGCAAAACAGGAAGGCAAAATGCCGAAAAAGGAATAAGGGCGACA  
CGGAAATGTTGAATACTCATACTCTCCCTTTCAATATTATGAAAGCATTATCAGGGTTATTGTCTCAT  
GACATTAACCTATAAAATAGGCAGT

FIG 12 A

### (1) C12ScFas Survival construct

C12ScFas: epsilon-cFas(CD95)-Ires-Hygro-BGH PolyA put into C12s vector backwards so that no leaky transcription happens through the cmv promoter.

# FIG 12 B

TTTTTACCAGGTTGGCATGGTGACAGCAAAATGGGCCTCCTGATATAATCCTTCTGAGCAGTTTATCAGTTCATG  
 AACCCGCCCTCAGCTTAAACTCTGGAGATGCTATTAGTACCTTGAGTATGAACCTTAACGTGAGCCAGCAAGCA  
 CCAGAGGCAGGACAGCCCAGATCCACACCATgGTGGCTTACCAACAGTACCGGAATGCCAAGCTGGCCGCTTAAGA  
 GCTGTAATTGAACCTGGGAGTGGACACCTGTGGAGAGAAAGGCAAAGTGGATGTCAGTAAGACCAATAGGTGCCTATCAG  
 AAACGCAAGAGTCTCTCGACAAGCCCAGTTCTATTGGTCTCCTAACCTGTCTTGTAAACCTGATACCTAC  
 CTGCCCAGTGCCTCACGACCAACTTctcgaggattcctggacagctccagatgtactgtaaaccgtgggttatttc  
 gtgcgggcatgtggagcctggtagggggagctgcctcagtgtttcagtaaaaatgggtggaaaccccCaggagg  
 cccggggcccccttggaaagttccctttctctgttcttggagaagtcgattgagcaacagcgggggtcaggtgaggctcc  
 ttcactaccatgcacaccgagtgtGggggagggttcttcgttcagggcccaacCcaggggccctgccttaggtccc  
 ggacttCactttgcgcacgcgtggctgtgtggccactcagcaacttgggtccctgtccctggaaaggag  
 ggtacttgggcacgcacgcctcgttcacacggaaacttgggtccctgtgaaggatggggcgttttgcaggagaatgagg  
 cgcactgaggtaactggccctggggGcgctgtccctgtgtgcaggccctctatggcccagccctgtcc  
 ctgtgaccctgtggagctggcacccctgagtgtggcctcacCTTGTACTCACTCCCAGGTACTGTCOtcgacGCAGGCC  
 GCTCGAcgtAAAATAAAAGATTTTATTAGTCTCCAGAAAAAGGGGGGAATGAAAGACCCACCTGTAGGTTGGCAAg  
 cttagcTTAAGTAACCCATTGCAAGGCATGGAAAAATACATAACTGAGAATAGAGAAGTTCAGATCAAGGTCGGAACAG  
 ATGGAACAGGCAATAAAAGAGCCCACAACCCCTCACTGGGGGCCAGTCCTCCGATTGACTGAGTCGCCGGTACCCG  
 TGTATCCAATAAAACCTCTTGCAGTTGCATCCGACTTGTGGTCTCGCTGTTCTTGGAGGGTCTCCTCTGAGTATTGA  
 CTACCGTCAGGGGGCTTCAcatgcaGCATGTATCAAATTAAATTGTTTCTTAAGTATTACATTAAAT  
 GGCCATagttcGTAATCATGGTCATAGCTGTTCTGTGTGAAATTGTTATCCGCTACAATTCCACACACATACGAG  
 CCGGAAGCATAAAAGTGTAAAGCCTGGGTGCTTAATGAGTGAGCTAACTCACATTAATTGCGTTGCCCTCACTGCCGCT  
 TTCCAGTCGGGAAACCTGTCGTGCCAGCTGCTTAATGAATGCCAACGCCGGAGAGGGCGTTGCGTATTGGCG  
 CTCTCCGCTTCTCGCTACTGACTCGCTGCGCTGGCGTTGCGTGCAGCTCACTCAAAGGG  
 TAATACGGTTATCCACAGAACAGGGATAACGCAGGAAAGAACATGTGAGCAAAAGGCCAGCAAAAGGCCAGGAACCGT  
 AAAAAGGCCGCGTTGCTGGCGTTTCCATAGGCTCCGCCCCCTGACGAGCATCACAAATGACGCTCAAGTCAGAG  
 GTGGCGAAACCGACAGGACTATAAGATAACCAGGCCTTCCCCCTGGAAGCTCCCTCGCGCTCTCTGTTCCGACCC  
 TGCCGCTTACCGATACTGTCGCCTTCTCCCTCGGAAGCGTGGCGTTCTCATAGCTCACGCTGTAGGTATCTC  
 AGTCGGTGTAGGTCGCTCCAAGCTGGCTGTGTCACGAACCCCCGGTTCAGCCGACCGCTGCCCTATCCGG  
 TAACTATCGTCTTGTAGTCCAACCCGGTAAGACACGACTTATGCCACTGGCAGCAGCCACTGGTAACAGGATTAGCAGAG  
 CGAGGTATGTAGGCGGTGCTACAGAGTTCTGAAGTGGTGGCTAACTACGGCTACACTAGAAGGACAGTATTGGTATC  
 TGCGCTCTGCTGAAGCCAGTTACCTCGGAAAAAGAGTTGGTAGCTCTGATCCGAAACAAACCACCGCTGGTAGCG  
 TGGTTTTTGTGCAAGCAGATTACGCGCAGAAAAAAAGGATCTCAAGAAGATCCTTGTATTTCTACGGGGT  
 CTGACGCTCAGTGGAACGAAACTCACGTTAAGGGATTGGTCACTGAGATTATCAAAAGGATCTCACCTAGATCCTT  
 TTAAATTAAAAATGAAGTTGCGAAATCAATCTAAAGTATATGAGTAAACTGGTCTGACAGTACCAATGCTTAAT  
 CAGTGAGGCACCTATCTCAGCGATCTGCTATTGCTCATCCATAGTTGCGTACTCCCCGTCGTAGATAACTACGA  
 TACGGGAGGGCTTACCATCTGGCCCCAGTGCTGCAATGATAACCGCAGACCCACGCTCACCGCTCCAGATTATCAGCA  
 ATAAACCAGCCAGCCGGAAGGGCGAGCGCAGAAGTGGTCTGCAACTTATCCGCTCCATCCAGTCTATTAAATTGTTG  
 CGGGGAAGCTAGAGTAAGTAGTTGCCAGTTAATAGTTGCGCAAGCTTGTGCGCATGCTACAGGCATCGTGGTGTAC  
 GCTCGTCGTTGGTATGGCTTCATTCAAGCTCCGGTCCAAAGGATCAAGGCAGTTACATGATCCCCATGTTGTGCAA  
 AAAGCGGTTAGCTCCTCGGTCTCCGATCGTCTCAGAAGTAAGTTGGCGCAGTGTATCACTCATGGTTATGGCAGC

# FIG 12 C

ACTGCATAATTCTTACTGTCATGCCATCCGTAAGATGCTTTCTGTGACTGGTGagtactcaaccaagtcattctgag  
aatagtgtatgcggcgaccgagttgcttgcggcgtcaacacggataataccgcgccatagcagaactttaaa  
gtgctcatcattggaaaacgttcttcggggcgaaaactctcaaggatcttaccgcgtttagatccagttcgatgttaacc  
cactcgtgcacccaactgatcttcagcatctttacttaccagcgttctgggttagcaaaaacaggaaggcaaaatg  
ccgcaaaaaagggaataaggcgacacggaaatgttgaataactcatactcttcctttcaatattattgaagcatttat  
cagggttattgtctcatgacattaacctataaaaataggcgt

FIG 13A

## (2) Ahhhh: Survival construct

2.) Ahhhh: epsilon-cFas' (CD8 or mLyt2)-Ires-Hygro-BGHpolyA also in C12s backwards

Fig- 13 B

tcaacatcagataaatttttgcgttccggactgttcaggatttaagggtggagattcatgagaaccttggtttccttctgt  
cttctgcgtttctgtactcccttccttcacccaaacaatttagtggaaattggaaaagaagaagacaaggccacc  
ccaaccgggttccggcccccttactgagccacggggccgacaatctctggctctggggtgagatgtcccgtaggg  
tgcacaggtagggagtgcagactggcttggtagtagtagactgttcacttctgaaggactggcacgacagaactgaa  
gtacatcaccggactgtgtactgagccaaagaaatagtagcgtttccctgtcaacttgcggatgttgcggtaggg  
acttattttctgtgtccctcatggcagaaaacagttcgcacattcagttctgtccacgttctggagatgttgcggat  
gaaggccatatacgacaacgaggggctggggatgttgcggatgttgcggagatgttgcggagatgttgcggat  
ggaccccaacacttccataccaggccacttctgaccaagttcgccgtccatttttggaaagatgttgcggat  
gtgcgtgtggcttagttctccactccccaggataatcgactcaccagcagcagcagcaggttcagcgcacagaaaagcgggtc  
aacggtgaggccatgtGGCTTACCAACAGTACCGGAATGCCAAGCTGCGCCGCTTAAGAGCTGTAATTGAACCTGG  
GAGTGGACACCTGTGGAGAGAAAGGCAAAGTGGATGTCAGTAAGACCAATAGGTGCCTATCAGAAACGCAAGAGTCTTCT  
CTGTCTCGACAAGCCCAGTTCTATTGGTCTCCTAACCTGTCTTGTAACCTTGATACTTACCTGCCAGTGCCTCACG  
ACCAACTTctgcaggaattctggacagctccagatgtacgtacgtacccgtggttttttctgtgcggggcagtggagc  
ctgggtagggggagctctgcctcagtgcctcagctaaaaatggggggaaacccCaggaggcccggggccctggaa  
gttccctttctctgttcttggaaagtcattgcattgcacacagcgggggtcagggtggacttactaccgtgcaca  
ccgagtgtGggggaggttctctcaggccaaacCcaggcccccgcctgcctaggtccggacttCactcttgac  
gcattgcgtggcttgcgttgcctccaggcagcaacttgcggggcccttgcgtggaaagggagggaggactgggcgc  
ccttgcgttccacgaaagcttgcgttgcgttgcgttgcgttgcgttgcgttgcgttgcgttgcgttgcgttgcgt  
gcctcgccccGcgcgtgtcccagatgtgtgtcaggccctctgtatggccgcagccctgtgttgcgttgcgttgcgt  
ctggcaccctgtgtgttgcgttgcgttgcgttgcgttgcgttgcgttgcgttgcgttgcgttgcgttgcgttgcgt  
AAGATTTATTTAGTCTCCAGAAAAAGGGGGAAATGAAAGACCCACCTGTAGGTTGGCAAgctagcTTAAGTAACCCA  
TTTGCAAGGCATGGAAAAATACATAACTGAGAATAGAGAAGTTCAAGATCAAGGTCGGAACAGATGGAACAGGCAATAAAA  
AGAGCCCACAACCCCTCACTCGGGCGCCAGTCCTCCGATTGACTGAGTCGCCGGTACCCGTGTATCCAATAACCC  
CTTGCAGTTGCATCCGACTTGTGGTCTCGCTGTTCTGGAGGGTCTCTGTAGTGATTGACTACCCGTCAKGCGGGGG  
TCTTTCAcatgcaGCATGTATCAAATTAAATTGGTTTTCTTAAGTATTACATTAATGCCATagttcGTAAT  
CATGGTCATAGCTGTTCTGTGTGAAATTGTTATCCGCTCACAAATTCCACACACATACGAGCCGGAAGCATAAAAGTGT  
AAAGCCTGGGGTGCTTAATGAGTGTGAGCTAACACATTAATTGCGTGTGCGCTCACTGCCGTTCCAGTCGGAAACCT  
GTCGTGCCAGCTGCATTAATGAATCGGCCACGCGCGGGAGAGGCGGTTGCGTATTGGCGCTTCCGTTCCCG  
TCACTGACTCGCTGCCGCTCGTCGGCTGGCTCGCGAGCGGTATCAGCTCACTCAAAGCGGTAAACCGTTATCCACA  
GAATCAGGGATAACGCAGGAAAGAACATGTGAGCAAAGGCCAGCAAAGGCCAGGAACCGTAAAAGGCCGCGTTGCT  
GGCGTTTCCATAGGCTCCGCCCTGACGAGCATCACAAATCGACGCTCAAGTCAGAGGTGGCAAACCCGACAG  
GACTATAAGATAACCAGCGTTCCCCCTGGAAGCTCCCTCGTGCCTCTCTGTTCGACCTGCCGTTACCGGATAC  
CTGTCCGCCCTTCTCCCTCGGGAGCGTGGCGTTCTCATAGCTCACGCTGTAGGTATCTCAGTTGGTGTAGGT  
TCGCTCAAGCTGGGTGTGACGAAACCCCGTTCAAGCCGACCGCTGCCCTATCCGTTACTATCGCTTGAGT  
CCAACCCGGTAAGACAGACTTATGCCACTGGCAGCCACTGGTAACAGGATTAGCAGAGCGAGGTATGTAGGCGGT  
GCTACAGAGTTCTGAAGTGGTGGCTAACTACGGCTACACTAGAAGGACAGTATTGGTATCTGCCTCTGCTGAAGCC  
AGTTACCTCGGAAAAAGAGTTGGTAGCTCTGATCCGCAAACAAACCCGCTGGTAGGGTGGTTTTTGTGCA  
AGCAGCAGATTACGCGCAGAAAAAAAGGATCTCAAGAAGATCCTTGATCTTCTACGGGTCTGACGCTCAGTGGAAAC  
GAAACTACGTTAAGGGATTGGTGTGAGATTATCAAAGGATCTCACCTAGATCTTTAAATTAAAAATGAAG  
TTTGCCTAAATCAATCTAAAGTATATGAGTAAACTTGGTCTGACAGTTACCAATGCTTAATCAGTGAGGACACCTATCT  
CAGCGATCTGTCTATTCGTCATCCATAGTGCCTGACTCCCGTGTGAGATAACTACGGATACGGAGGGCTTACCA  
TCTGGCCCCAGTGCTGCAATGATACCGCGAGACCCACGCTCACCGGCTCCAGATTATCAGCAATAACCCAGCCAGCCGG  
AAGGGCCGAGCGCAGAAGTGGTCTGCAACTTATCCGCTCCATCCAGTCTATTGCTACAGGCATCGTGGTGTCA  
GTAGTTGCCAGTTAATGTTGCGCAACGTTGCTACAGGCATCGTGGTGTCACTGCTGTTGGTATG

# FIG 13C

GCTTCATTCAAGCTCCGGTCCCCAACGATCAAGGCAGTTACATGATCCCCATGTTGTGCAAAAAAGCGGTTAGCTCCTT  
CGGTCCCTCGATCGTTGTCAGAAGTAAGTTGCCGCAGTGTATCACTCATGGTTATGGCAGCACTGCATAATTCTCTTA  
CTGPCATGCCATCCGTAAGATGCTTTCTGTGACTGGTGagtactcaaccaagtcatctgagaatagtgtatgcggcga  
ccgagttgctctgcccggcgtcaacacggataataccgcgccacatagcagaactttaaaagtgtcatcattggaaa  
acgttctcgccccgaaaactctcaaggatcttaccgtgtttagatccaggatcgatgtaaaccactcgtgcacccaact  
gatcttcagcatctttactttcacccagcgttctgggttagcaaaaacaggaaggcaaatgcccggaaaaaggaaata  
agggcgacacggaaatgttaatactcatactttcaatattattgaagcatttatcagggttattgtctcat  
gacattaacctataaaaataggcgt